In The Claims

Please cancel claims 1-29 without prejudice, and add new claims 30-49.

30. (new) An aluminum-containing material deposition method comprising:

depositing a first precursor on a substrate while preventing gas phase reaction of the first precursor and a second precursor with which the first precursor otherwise exhibits gas phase reactivity, the first precursor comprising a chelate of $Al(NR^1R^2)_x(NR^3(CH_2)_zNR^4R^5)_y$ or $Al(NR^1R^2)_x(NR^3(CH_2)_zOR^4)_y$; where x is 0, 1, or 2; y is 3 - x; z is an integer from 2 to 8; and R^1 to R^5 are independently selected from among hydrocarbyl groups comprising 1 to 10 carbon atoms with silicon optionally substituted for one or more carbon atoms; and

reacting the deposited first precursor with the second precursor and forming an aluminum-containing material.

31. (new) The method of claim 30 wherein the deposition method comprises atomic layer deposition and the first and second precursors are deposited as monolayers.

32. (new) The method of claim 30 wherein the first precursor consists essentially of $Al(N(CH_3)_2)_2(N(CH_3)CH_2CH_2N(CH_3)_2)$.

33. (new) The method of claim 30 wherein depositing the first precursor occurs at a temperature of from about 100 °C to about 450 °C.

34. (new) An atomic layer deposition method comprising:

exposing a substrate to a first precursor and chemisorbing a first monolayer containing at least a portion of the first precursor on the substrate, the first precursor comprising a chelate of $Al(NR^1R^2)_x(NR^3(CH_2)_zNR^4R^5)_y$ or $Al(NR^1R^2)_x(NR^3(CH_2)_zOR^4)_y$; where x is 0, 1, or 2; y is 3 - x; z is an integer from 2 to 8; and R^1 to R^5 are independently selected from among hydrocarbyl groups comprising 1 to 10 carbon atoms with silicon optionally substituted for one or more carbon atoms;

reacting a second precursor with the first monolayer and forming a product layer.

35. (new) The method of claim 34 wherein the hydrocarbyl groups are selected from among alkyl, alkenyl, cycloalkyl, cycloalkenyl, or aryl with silicon optionally substituted for one or more carbon atoms.

36. (new) The method of claim 34 wherein the first precursor is a liquid at a temperature of from about 20 °C to about 100 °C.

37. (new) The method of claim 34 wherein the first precursor is vaporized at a temperature of from about 25 °C to about 150 °C.

38. (new) The method of claim 34 wherein the first precursor exhibits a vapor pressure of at least about 0.1 Torr at a temperature of from about 25 °C to about 150 °C.

39. (new) The method of claim 34 wherein the first precursor exhibits a chemisorption rate of at least about 0.5 monolayers per second at 10^{-4} Torr with a solid surface comprising an oxide having hydroxyl groups on the oxide surface, platinum, rhodium, iridium, titanium, TiN, TaN, TaSiN, TiBN, or silicon.

40. (new) The method of claim 34 wherein the first precursor is non-pyrophoric.

41. (new) The method of claim 34 wherein the first precursor comprises a single species and is optionally mixed with a non-reactive carrier gas.

42. (new) The method of claim 34 wherein the substrate comprises at least one of an oxide material and a metal element.

43. (new) The method of claim 34 wherein chemisorbing the first precursor occurs at a temperature of from about 100 °C to about 450 °C.

44. (new) The method of claim 34 wherein z is an integer from 2 to 4.

45. (new) The method of claim 34 wherein R^1 to R^5 are independently selected from among hydrocarbyl groups comprising 1 to 5 carbon atoms with silicon optionally substituted for one or more carbon atoms.

46. (new) The method of claim 34 wherein the second precursor comprises at least one of O_2, O_3, H_2O, ammonia, hydrazine, alkyl-hydrazine compounds, and other hydrazine derivatives.

47. (new) The method of claim 34 wherein reacting the second precursor occurs at substantially the same temperature as chemisorbing the first monolayer.

48. (new) The method of claim 34 wherein the product layer comprises AlN or Al_2O_3.

49. (new) An atomic layer deposition method comprising:

exposing a substrate to a first precursor and chemisorbing a first monolayer containing at least a portion of the first precursor on the substrate at a temperature of from about 150 °C to about 250 °C, the first precursor comprising $Al(N(CH_3)_2)_2(N(CH_3)CH_2CH_2N(CH_3)_2)$ and the substrate comprising at least one of metal oxide, platinum, titanium, and TiN;

purging excess first precursor from the over the substrate;

reacting a second precursor with the first monolayer and forming a product layer containing at least one of AlN or Al_2O_3, the second precursor comprising at least one of O_2, O_3, H_2O, ammonia, hydrazine, alkyl-hydrazine compounds, and other hydrazine derivatives;

purging excess second precursor from the over the substrate; and

successively repeating exposure and purging of the first and second precursors to form additional product layers.